

STEREO MOC Status Report  
Time Period: 2017:009 - 2017:015

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 010, during the DSS-14 support, turbo decoder lock was lost intermittently beginning at 2350z through 011-0045z. This anomaly resulted in the loss of 3307 frames of real-time and SSR data or 41 seconds of SSR playback data for each instrument. See DR# G117739 for more information.
- On day 012, during the DSS-14 support, turbo decoder lock was lost intermittently beginning at 2302z through 2305z due to weather. This anomaly resulted in the loss of 10,276 frames of real-time and SSR data or 2.1 minutes of SSR playback data. See DR# G117745 for more information.
- On day 012, the DSN delivered the corrected the tracking data for days 001 through 003 from DSS-14 to the FDF. Recall that the leap second was applied late at Goldstone, on day 004. For STEREO Ahead, this affected the first three days of tracking data, telemetry data, and timekeeping processing. See DR# N110457, N110458 and N110459 for more information.
- On day 013, the hard disk on the primary Ahead command workstation in the MOC was replaced. The MOC will resume operations on the primary command workstation next week after shadow testing is completed. The instrument teams will be notified as some may need to reconfigure to use a different real-time stream, #106, to continue receiving real-time telemetry.
- On day 014, automated retrieval of DSN schedules and viewperiods, that has stopped on day 006 due to an SPS hardware upgrade, resumed after the DSN reset the account passwords.
- On day 014, during the DSS-14 support, turbo decoder lock was lost intermittently beginning at 0056z through 0057z due to antenna brakes being set momentarily. This anomaly resulted in the loss of 962 frames of real-time and SSR

data or 12 seconds of SSR playback data for each instrument. See DR# N110484 for more information.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.
  - The average daily science data return for Ahead was 5.7 Gbits during this week.

#### STEREO Behind (STB) Status:

1. Detailed status of the recovery activities this week to restore operations is listed below.
  - None.
2. The Behind loss of communication anomaly occurred on October 1, 2014. Post superior solar conjunction, recovery operations resumed on November 30, 2015. By implementing the NASA Failure Review Board recommendations, the first recovery attempt began with carrier detection by the DSN on August 21<sup>st</sup>, through September 23, 2016. At a spacecraft range of ~2 AU, the observatory was found to be rotating slowly about its principal axis of inertia for which the uncontrolled attitude allowed some solar array input and continuous uplink and downlink communications on the LGA at emergency data rates. Over the next 22 continuous days, significant obstacles to recovery were overcome with a collaborative effort of the JHU/APL engineering team, NASA GSFC, DSN, FDF, SSMO scheduling, and Mission Operations teams. This consisted of:
  - Reliably commanding a rotating spacecraft with uncontrolled attitude at a distance of 2 AU
  - How to power on the spacecraft that was never designed to be off without collapsing the battery voltage
  - Acquiring telemetry at 35 bps from a spacecraft that is rotating with an uncontrolled attitude
  - Warming a frozen propulsion subsystem with a degraded battery and limited solar array input with an uncontrolled attitude
  - Configuring, loading, and verifying EA, C&DH, and G&C parameters and macros with very limited telemetry
  - Conducting an autonomous momentum dump in the blind and transitioning to C&DH standby mode and successfully

receiving telemetry on the HGA indicating star tracker lock and decreasing system momentum.

However, system momentum level remained above the threshold for re-establishing attitude control with the reaction wheels. Due to the uncontrolled attitude, communication degraded and the last detection of the carrier was on September 23<sup>rd</sup>.

Behind Observatory Status - From the last telemetry received on September 18<sup>th</sup>, main bus voltage is low, 2 out of 11 battery cells are currently not functioning, attitude remains uncontrolled, rotating at a ~45 second period about its principal axis of inertia. While propellant is suspected to be frozen, last telemetry indicated both propulsion tank latch valves are open and pressure transducer #2 is not functioning. EA mode is enabled. The battery charge rate is C/10. Necessary macro sequences have been tested to allow the peak power tracker in C&DH standby mode to protect the battery. These macro sequences will be loaded to EEPROM when the communications supports longer commands.

Monthly recovery efforts consist of attempting to power on the transmitter for 30 minutes. If no carrier signal is detected, battery recovery operations will commence which consist of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off. The next recovery tracks are on January 20<sup>th</sup>, 21<sup>st</sup>, and 22<sup>nd</sup>.